MDOT
Michigan Department of Transportation

OFFICE MEMORANDUM

DATE: May 14, 2004

TO: Region Engineers
Region Delivery Engineers
TSC Managers
Resident/Project Engineers
Region Construction Engineers

FROM: Larry E. Tibbits
Chief Operations Officer

John C. Friend
Engineer of Delivery

SUBJECT: Bureau of Highway Instructional Memorandum 2004-16
Implementation of Tensile Strength Ratio (TSR) Worksheet, Form 1937

A Tensile Strength Ratio (TSR) Worksheet, form 1937, is being implemented to standardize all TSR testing information. An electronic version of form 1937 (01/04) is available at www.mdot.state.mi.us/webforms.

This form must be used when TSR information is submitted for Superpave Hot Mix Asphalt mix designs. The form must be filled out by the contractor or the contractor's representative. An example of a completed form is attached for reference purposes.

Chief Operations Officer

Engineer of Delivery

BOHD:C/T:EHR:kab
Index: Procedures Manual
Attachment

cc: C & T Support Area Staff
Real Estate Support Area, M. DeLong
Design Support Area, M. VanPortfleet
Maintenance Support Area, C. Roberts
Traffic & Safety Support Area, J. Culp
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Michigan Department
of Transportation
1937 (01/04)

TENSILE STRENGTH RATIO (TSR) WORKSHEET (AASHTO T-283)

Project Number	Date	Mix Design Number
STX485551-55748	Mar 11, 2004	
Contractor		Type of Mixture
JOHN DOE`		4E3

	A	B	C	D = (B-C)	E = (A/D)	F	G = (F-E)/F*100	H	I = H/25.4
Sample #	Weight in Air	SSD Weight	Weight in Water	Volume of Sample	Gmb	Gmm	Air Voids	Height (mm)	Height (inch)
1	3949.0	3958.1	2318.4	1639.7	2.408	2.582	6.74	95.0	3.740
2	3947.5	3954.4	2317.3	1637.1	2.411	2.582	6.62	95.0	3.740
3	3947.0	3958.9	2316.3	1642.6	2.403	2.582	6.93	95.0	3.740
4	3954.3	3963.6	2324.8	1638.8	2.413	2.582	6.55	95.0	3.740
5	3950.4	3960.0	2320.3	1639.7	2.409	2.582	6.70	95.0	3.740
6	3949.7	3961.9	2323.9	1638.0	2.411	2.582	6.62	95.0	3.740

CONDITIONED SET

	J = (G/100) * D	B	K	L=((K - B)/J)*100	M	N=2M/(3.14*5.9*l)	S1
Sample #	Volume of Air Voids	Initial SSD Weight	Saturated SSD Weight	Percent Saturation	Load (Lbs)	Tensile Strength (TS)	Avg. Tensile Strength
4	107.3	3963.6	4041.7	72.8	2188	63.2	
5	109.9	3960.0	4041.8	74.4	2067	59.7	**61.6**
6	108.4	3961.9	4039.5	71.6	2147	62.0	

UNCONDITIONED SET

	M	N=2M/(3.14*5.9*l)	S2
Sample #	Load (Lbs)	Tensile Strength (TS)	Avg. Tensile Strength
1	2374	68.5	
2	2319	66.9	**67.5**
3	2324	67.1	

(S1/S2)*100
Tensile Strength Ratio (TSR)
91.3%